

The Effect of Monetary Reward on Creativity: The Role of Motivational Orientation

Kai Wang
School of Management and Marketing,
Kean University
kaiwan@kean.edu

Patricia J. Holahan
School of Business
Stevens Institute of Technology
pholahan@stevens.edu

Abstract

The prolonged debate on the effect of monetary reward on creative performance is still ongoing. Research has shown monetary rewards to have both positive and negative effects on creative performance. We contend that a person's motivational orientation moderates the effect of monetary rewards on creative performance. An experiment was conducted showing that creative performance can be influenced through two distinct causal pathways. The pathways appear different for people driven predominately by extrinsic motivation and those driven predominately by intrinsic motivation. The exact role of how motivational orientation affects the relationships between monetary reward and creative performance needs further investigation. However, this study generates some insights and suggests directions for future research.

1. Introduction

Business organizations increasingly depend on innovations to compete and thrive [40]. All innovations depend on creative work, which produces new and useful ideas or products. Therefore, motivating creative work is an important concern for business organizations. While incentive plans are often used, and indeed proven effective, for improving employee performance [11], the effect of different incentives on creative performance remains elusive [30]. There is a prolonged debate about whether monetary rewards improve creative performance [20]. Presently, there are two schools of thought, based on self-determination theory (SDT) and learned industriousness theory (LIT), respectively [14, 22]. With contradicting presumptions and logic, these two schools have opposite predictions with regard to the effect of monetary rewards on creativity. This article reviews the literature on the effect of incentives, especially monetary incentives, on individual creative

performance. In an attempt to resolve the controversy about the effect of monetary rewards on creative performance, personal characteristics are proposed to moderate such effect. An empirical study is conducted to test a set of new hypotheses.

2. Literature Review

2.1. Motivations for Creative Work

With regard to creative work, it has long been argued that different motivations have different effects. Crutchfield [15] contended that intrinsic motivation promotes creative thinking while extrinsic motivation inhibits it. Intrinsic motivation is defined as the desire to do something for the interest, enjoyment and personal challenge, as opposed to external consequences [30]. The positive effect of intrinsic motivation on creativity has much empirical support [4,29,39]. The positive effect can be attributed to increased time spent on a task [40], increased curiosity, cognitive flexibility, risk taking, persistence [49] and positive mood states [5]. More than merely a positive factor, intrinsic motivation is proposed to be essential for the creation of knowledge and ideas [42]. In the componential theory of creativity [2], intrinsic motivation plays a key role in task motivation, one of the three components of individual creativity (the other two are domain-relevant skills and creativity-relevant skills). Extrinsic motivation is defined as the desire to do something for attaining certain separable outcomes [45]. Further analysis leads to the classification of extrinsic motivation into external motivation, introjected motivation, identified motivation and integrated motivation [45]. External motivation is based on external contingencies, such as monetary reward. The research on extrinsic motivation is focused on external motivation. The effect of external motivation on intrinsic motivation, and in turn creativity, has mixed results in the research. Introjected motivation results from partial

internalization of normative pressure as sense of obligation. Identified motivation occurs when a behavioral goal or regulation is evaluated such that the activity becomes personally important. For example, a person may desire to do something because it leads to consequences that are personally meaningful, even though the activity is not especially enjoyable itself. It is expected that the combination of identified and intrinsic motivation can be powerful in facilitating creativity [34], although the notion is not empirically tested. Integrated motivation is the most autonomous form of extrinsic motivation. It occurs when identified motivation is fully assimilated and becomes congruent with one's other values and needs. High originality of output is suggested to require a high degree of intrinsic motivation while a high level of usefulness or appropriateness can result from a high degree of either intrinsic or extrinsic motivation or both [3]. In addition to intrinsic and extrinsic motivations, some have also argued that prosocial motivation, the desire to benefit others, contributes to creative output [24,27].

Numerous studies examined the effect of extrinsic reward on intrinsic motivation, although they didn't necessarily deal with creative tasks. A meta-analysis of 128 empirical studies shows that tangible rewards generally decrease intrinsic motivation, even if the tangible rewards are used as indicators of good performance [17]. This is because such rewards are often perceived as controlling and decrease the degree to which people take responsibility for motivating themselves. However, positive feedback is shown to improve intrinsic motivation.

Some research deals with correlating creative performance with real-life motives. Using data on industrial scientists and engineers, Sauermann and Cohen [46] found that motives for intellectual challenge, independence and income are strongly positively related to creative output. In the meantime, desires for job security and greater responsibility are negatively related to creative outcome. The effects of these motives appear to be mediated through the character of effort (e.g. the quality of cognitive effort or the division of effort among different activities), as opposed to the quantity of effort (hours worked).

2.2. Rewards for Creative Work

Non-monetary rewards are often found to be positively related to creativity. As noted earlier, a meta-analysis found that positive feedback improves intrinsic motivation [17]. A survey of R&D employees found that non-monetary rewards, such as recognition, led to longer work time relative to monetary rewards [40]. They further verified that non-monetary rewards promoted innovation through enhanced intrinsic

motivation. These effects were attributed to enhanced sense of control and self-actualization [12] and heightened interest due to appreciation and self-importance [25].

The effect of monetary incentives on creativity is much less clear and under continuous debate. One school is based on self-determination theory. SDT assumes that intrinsic motivation is crucial in determining performance and people try to meet their fundamental psychological needs such as self-determination and sense of competence [14]. Perceived self-determination is defined as "individuals' view that their behavior is self-initiated, self-regulated, and accompanied by feelings of freedom during task performance" [20]. SDT proposes that the effect of rewards depends on the internalization of extrinsic motivation or the feelings of being controlled. This school argues that monetary reward reduces intrinsic motivation and in turn creativity. Specifically, people perceive the promise of reward as an attempt to control their behavior, which reduces the perception of self-determination and in turn interest and motivation [4,16,42]. Similarly, it's been argued that performance-contingent rewards result in lower intrinsic motivation due to lower level of internalization [47] or the externalization of the locus of motivation [44]. Likewise, the reduction in intrinsic motivation is attributed to the overjustification effect, i.e. the perception that task performance is motivated by the reward, instead of the task itself [37]. Monetary rewards are also suggested to distract people from the creative process [4]. This school gained considerable support from experimental studies [6,36].

Another school relies on learned industriousness theory, or similar expectancy-valence perspectives [14]. LIT assumes that people try to avoid cognitive effort and performance depends on learned habits. LIT contends that reinforcing high performance results in a generalized reduction in the aversiveness of effort and leads to generalized high performance [18]. This school collects empirical evidences that monetary rewards can enhance creativity [19, 23]. Eisenberger and Shanock [22] point out two major issues with the studies supporting the negative effect of monetary rewards. First, the participants in those studies were generally not informed on the contingency of reward on creative performance. Therefore, the reward did not explicitly encourage creativity in the output. This is an important drawback considering that a productivity goal leads to low creativity, but the addition of a creativity goal (e.g. 90% of your ideas should be creative) leads to higher creativity [48]. Second, only a few studies actually assess the effect of reward on perceived self-determination, a proposed mediator of

the negative effect of reward on creativity. Moreover, Eisenberger and colleagues show that rewards increase, instead of decrease, perceived self-determination [21]. The positive effect of monetary rewards on creativity is attributed to increased intrinsic motivation resulting from three effects. First, monetary rewards enhance perceived self-determination [23]. The offer of monetary rewards indicates that the reward giver lacks control over the performance of participants and the participants can decline the reward if they want to [22]. Second, monetary rewards deliver information about personal competencies, which can promote perceived competence [18,19]. Third, monetary rewards can lead to higher commitment to the goal and performance pressure, an uncomfortable perception of the need for high performance, which in turn leads to task concentration, the use of higher order skills, and higher intrinsic interest [20]. There is empirical evidence that expected monetary reward increases creativity when participants know the necessity of creative performance either from instructions or prior experience [22]. Eisenberger and Rhoades [21] also found that monetarily rewarding creativity in a preliminary task increased the creativity for a subsequent task without expected reward. This suggests that monetary rewards for creativity direct people towards creative effort, which in turn leads to creative performance.

Hennessey and colleagues showed that the demotivating effects of rewards can be reversed [32] or offset [31] by emphasizing intrinsic interest. They further contended that when rewards are interpreted as informational, as opposed to controlling, they can have positive effect on intrinsic motivation [32]. Hennessey and Amabile [30] argued that rewards decrease intrinsic motivation and creativity when they reduce perceived self-determination, but enhance intrinsic motivation and creativity when they provide valuable information in a supportive manner, increase perceived competence, or facilitate intrinsically motivating work. The positive effect of rewards is most likely when the initial level of intrinsic motivation is strong [3]. However, the debate is still not settled. For example, the two schools do not agree on whether monetary rewards reduce perceived self-determination. The conditions under which monetary reward is beneficial to creativity are still not agreed upon.

The conflicting results on the effect of monetary rewards on creativity have also been attributed to various interactions of personal and contextual factors [49]. Baer et al. [9] found a positive relationship between rewards and creativity for adaptors (as in Kirton's Adaption-Innovation Theory [34] working on

relatively simple jobs. The relationship between rewards and creativity for innovators working on complex jobs is weak. The relationship for adaptors working on complex job and for innovators working on simple job is negative. In a study on product design, the provision of monetary rewards did not impact creativity significantly [13]. However, the combination of monetary rewards with creativity training was found to enhance intrinsic motivation and in turn creativity. This is because training on creativity techniques increases perceived competence and intrinsic motivation. With training, reward further affirms people's creative efforts and thus increases intrinsic motivation [13]. Malik and colleagues showed that extrinsic rewards contributed to creativity for people who have high creative self-efficacy and an internal locus of control [39]. Considering these personal and contextual factors improves our understanding of this topic.

3. Theoretical Development

Since both sides of the debate agree that completion and performance-contingent rewards reduce creativity [14], our arguments will be focused on creativity-contingent reward. As Byron and Khazanchi [14] point out, the core theories of two schools, LIT and SDT, are based on different assumptions. Specifically, the two theories disagree on 1) whether cognitive effort is fundamentally aversive; 2) whether people's behavior is driven by fundamental psychological needs, such as self-determination; 3) whether performance relies on learned habits. The different presumptions of the two theories make it hard to blend them in one explanation. However, since both sides of the debate have significant empirical evidence, as well as some sound arguments, it is suggested that both theories need to be integrated [14]. To resolve this issue, we propose that LIT and SDT represent two ways of how rewards can affect creative performance. Moreover we propose that which theory applies is influenced by a person's motivational orientation. The research model is illustrated in Figure 1.

As may be seen in Figure 1, we propose that the effects of a monetary reward on creative performance for extrinsically motivated individuals operates via increased performance pressure (the blue paths in Fig 1.) While the effects of a monetary reward on creative performance for intrinsically motivated individuals operates by diminishing self-determination, which in turn diminishes intrinsic task interest (the red paths in Fig 1). Amabile and colleagues developed the Work Preference Inventory (WPI) and found evidence to support that people have stable trait-like motivational

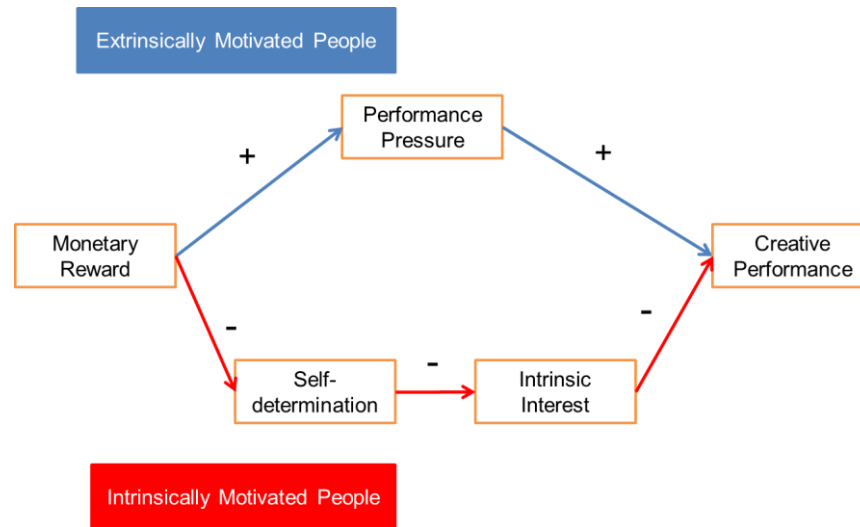


Figure 1 Theoretical Model

orientations [7]. While some people are intrinsically motivated towards tasks, others are motivated by extrinsic consequences; still others are motivated by both. Relatedly, Deci and Ryan [16] suggest that some people are more focused on autonomy-supporting aspects of work while others are more focused on the controlling aspect. We propose that people who are primarily extrinsically motivated are less concerned about intrinsic task interest. Rather they exert cognitive effort mainly to obtain desirable extrinsic consequences. In this case, LIT is the most applicable theory. These people's performance is directly dependent on projected extrinsic consequences. It is natural for them to internalize monetary reward offered and become motivated by it. When the monetary reward is contingent upon creative performance, the person would strive to increase the probability of attaining creative performance, therefore increasing the pressure to perform well. With this increased performance pressure, creative performance would increase. As mentioned earlier, since cognitive effort is mainly driven by external consequences, self-determination theory is not the primary mechanism through which motivation operates for individuals whose motivational orientation is predominately extrinsic.

Hypothesis 1. When a person is primarily extrinsically motivated, a creativity-contingent monetary reward has a positive effect on creative performance. This effect is mediated by increased performance pressure.

We further contend that, when a person is predominately intrinsically motivated, he or she is generally less concerned about monetary reward itself.

Rather he or she is primarily driven by intrinsic interest and positive challenges in tasks [30]. The major mechanism for a reward to affect motivation is through its effect on perceived self-determination and intrinsic motivation [45]. For predominately intrinsically motivated individuals, the offering of monetary reward may distract from creative effort, or result in overjustification, which leads to lower self-determination and therefore lower intrinsic task interest [4,37]. Therefore, monetary reward would lead to lower intrinsic motivation, hence lower creativity.

Hypothesis 2. When a person is primarily intrinsically motivated, a creativity-contingent monetary reward has a negative effect on creative performance. This effect is mediated by decreased self-determination and decreased intrinsic interest.

This research does not address the conditions where an individual's motivational orientation driven by both intrinsic and extrinsic motivators.

4. Methods

4.1. Procedures

We conducted an experiment to test the hypotheses. All the independent and dependent variables were measured using scales developed in the prior literature. The research sample consists of 240 college students enrolled in business classes at a technical university in the northeastern US.

Prior to participating in the study, all participants completed a measure of creative self-efficacy and the Work Preference Inventory (WPI) and. Creative self-

efficacy was measured with the three-item measure from Tierney and Farmer [50]. The Cronbach's alpha is reported to be .83 [50]. The WPI is a measure of motivational orientation and all the items are listed in the original article [7]. For each participant there are two scores: IM (intrinsic motivation) and EM (extrinsic motivation). A participant's score on the WPI was used to identify his or her motivational orientation. Amabile et al.'s [7] prior work had determined population mean scores for college students. The population mean IM score for students is 2.99, and the population mean EM score for students is 2.56 [7]. Participants with IM scores at or above the population mean and EM scores below the population mean were identified as primarily intrinsically motivated ($n=58$). Participants with EM scores at or above the population mean and IM scores below the population mean were identified as primarily extrinsically motivated ($n=66$). Some participants scored high (or low) on both IM and EM. These participant's data were recorded, but not used for hypotheses testing ($n=90$ and $n=26$, respectively). Participants were randomly assigned to the control (no reward) or the reward condition and given the following task to complete (the Appendix has the complete survey).

Participants in the no reward condition were asked to provide ten creative titles for a story about popcorn [20].

You are a tiny golden kernel of popcorn lying in the bottom of a frying pan. Look around you and see the other popcorn kernels that are snuggled up close to each other. Feel it heating, getting warmer, hotter, now burning underneath you. Close to you a popcorn kernel explodes. One by one other popcorn kernels pop to life. White clouds appear to be bursting out all around you. The sound of popping drums in your ears. You are cramped, uncomfortable, steaming hot, sweating dizzy. Your whole body feels too tight. You are trapped within a too-tight suit. Suddenly, you, the popcorn kernel, feel yourself exploding, bursting. All at once you are light and fluffy. Bobbing up and down with other popcorn. At last the popping sound begins to quiet. Just an occasional pop, pop, and at last silence.

Participants were told that a creative title is defined as a title that is both novel and relevant. In addition, the instructions indicated "We will be judging the creativity of your titles on a scale of 1 to 7 with 7 being very creative. If your average creativity score (average for the ten titles) is above 5.5, you will be notified of your excellent job."

Subjects in the reward condition, were given the same instructions and the same task, except that these subjects were told "We will be judging the creativity

of your titles on a scale of 1 to 7 with 7 being very creative. If your average creativity score (average for the ten titles) is above 5.5, you will be rewarded \$20 for your excellent job."

In the no reward condition, we still promised that high performer would be notified. This was to separate the effect of promised monetary reward from the effect of its informational aspect. Specifically, any monetary reward is associated with some information on people's performance or competence and the promise of such information alone can affect performance [26]. We want to examine the distinct effect of promised monetary reward, controlling for the effect of promised feedback on performance.

After 30 minutes the experimenter asked the participants to complete a post-task survey, which included measures of intrinsic task interest, perceived self-determination, and perceived performance pressure. Creativity of each title was assessed by independent raters as explained below.

4.2. Measures

All the measures are based on 7-point Likert scales unless otherwise noted.

The scales measuring intrinsic task interest, perceived self-determination, and performance pressure are from Eisenberger and Aselage [20]. Their Cronbach's alpha values are reported to be .91, .79, and .88, respectively [20]. Reward is coded as a dummy variable, with the no reward condition as 0 and the reward condition as 1.

The measure of creative performance was developed in two steps. First, two raters (PhD students in the business school) went through training conducted by one of the authors. Creativity is defined as being both original and relevant. After being presented with the definitions of originality and relevance, the raters were instructed to individually rate 20 titles randomly selected from the responses of the participants. They used a Likert scale ranging from "not at all creative" (1) to "highly creative" (7). After completing this pilot rating, the raters jointly discussed the ratings and resolved disagreements. In the second step, the two raters independently rated all the titles generated using the same scale as above. The titles were randomly ordered. The two ratings for each title were then averaged to obtain a creativity score for each title. The interrater reliability is acceptable as evidenced by the intraclass correlation coefficient ($ICC(2,2)=0.67$). The ten title scores for each participant were then averaged to obtain a creative performance score for each person. This measure is called mean creativity. We also included a measure called good idea count [43], which is operationalized

Table 1. Item loadings and cross loadings.

	II	PP	PS
II2	0.917	-0.129	0.491
II3	0.869	-0.166	0.395
PP1	-0.145	0.845	-0.185
PP3	-0.135	0.876	-0.019
PS1	0.316	-0.078	0.707
PS2	0.395	-0.06	0.856
PS3	0.315	0.035	0.717
PS4	0.460	-0.198	0.749

II: Intrinsic interest
PP: Performance pressure
PS: Perceived Self-determination

as the number of a participant's titles with creativity ratings above 4.

5. Results

Confirmatory factor analysis of all the variables showed that the 2nd, 4th and 5th items in performance pressure had low factor loadings and were therefore removed. The 1st and 4th item of intrinsic interest, as well as the 5th item of perceived self-determination were removed due to cross loading. After the removal, all item factor loadings are significant and above 0.70 (see Table 1). All cross loadings are below 0.50.

Table 2 presents descriptive statistics and the correlation matrix for our research sample (n=124). The research sample consists of individuals who were identified as primarily intrinsically motivated (n=58); or primarily extrinsically motivated (n=66).

Mean creativity has a limited range and may limit the probability of detecting a relationship. Therefore, good idea count was used as the measure of creativity. This measure has been shown to be a valid and reliable

measure of creative performance [43], and it reflects what is desired in the workplace [1].

To test the hypotheses, path analysis was conducted using SmartPLS3 with 5000 re-samples. Subsample analyses were conducted for extrinsically motivated (n=66) and intrinsically motivated (n=58) groups. The results are presented in Figure 2.

Hypothesis 1 predicted for extrinsically motivated people, monetary reward is positively related to performance pressure, which in turn is positively related to creative performance. As seen in Figure 2a, the relationship between monetary reward and performance pressure is positive but nonsignificant ($\beta=0.138$, $p=0.569$). The path between performance pressure and creative performance is also positive and nonsignificant ($\beta=0.252$, $p=0.179$). Thus, hypothesis 1 is not supported.

Interestingly, the paths between self-determination and intrinsic interest and between intrinsic interest and creative performance, the paths which were proposed to be nonsignificant, show significance. Specifically, for extrinsically motivated individuals, self-determination is related to intrinsic interest ($\beta=0.536$, $p<.001$), which in turn is related to creative performance ($\beta=0.313$, $p<.01$).

Hypothesis 2 predicted for intrinsically motivated people, monetary reward reduces self-determination, which in turn reduces intrinsic interest; which leads to lower creative performance. Figure 2b shows that the relationship between monetary reward and self-determination is negative, but nonsignificant ($\beta=-0.146$, $p=0.299$). The relationship between self-determination and intrinsic interest is positive and significant ($\beta=0.461$, $p=0.012$). The relationship between intrinsic interest and creative performance is nonsignificant ($\beta=0.103$, $p=0.437$). In contrast to the prediction that for intrinsically motivated individuals, the path between performance pressure and creative performance would be nonsignificant, there is a positive relationship between performance pressure

Table 2. Descriptive Statistics and Correlation Matrix for the Measured Variables (n=124)

Construct	Min	Max	Mean	S.D.	Cronbach's Alpha	Inter-Construct Correlations				
						CSE	II	PS	PP	GIC
CSE	3.33	7	5.17	0.81	0.68					
II	2	7	5.16	1.22	0.70	.01				
PS	1	7	4.33	1.20	0.70	-.06	.43**			
PP	1	7	3.67	1.43	0.69	-.07	-.08	.03		
GIC	0	5	1.09	1.25	NA	.13	.15	.07	.22*	
MeanC	2.3	4.3	3.13	0.40	NA	.11	.14	.06	.19*	.78**

** $p \leq .01$

* $p \leq .05$

CSE: Creative Self-efficacy

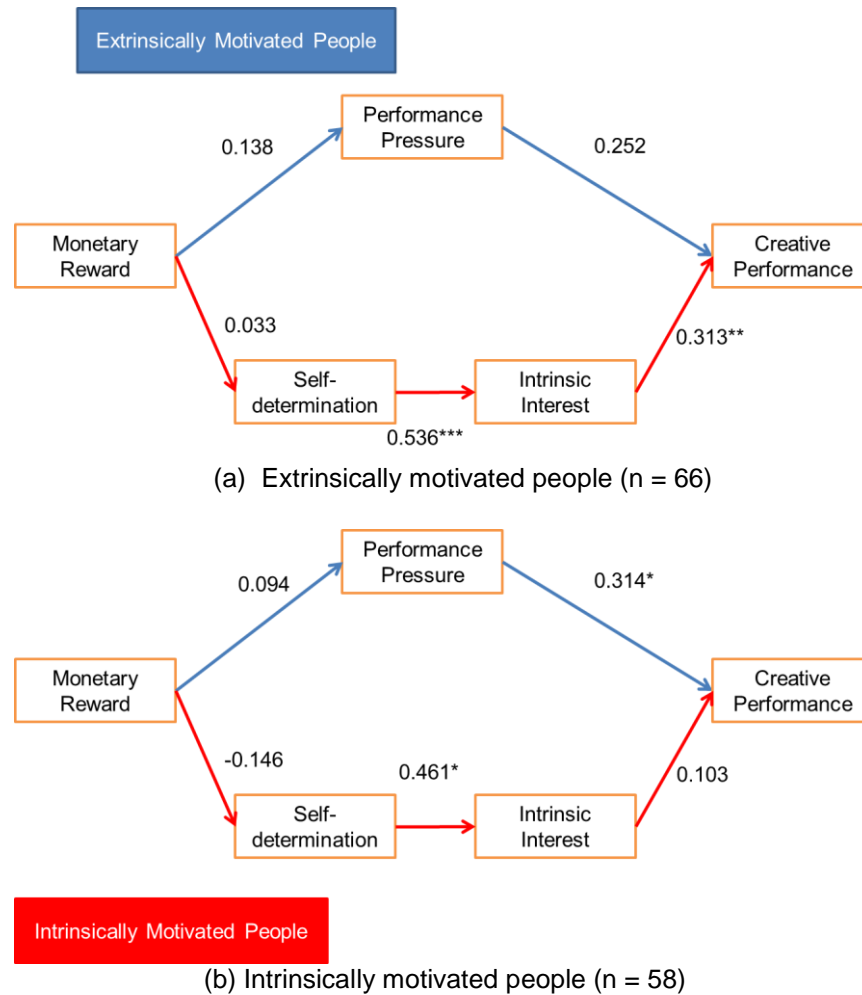
II: Intrinsic Task Interest

PS: Perceived Self-determination

PP: Performance Pressure

GIC: Good idea count

MeanC: Mean Creativity from each participant



*: $p < .05$
 **: $p < .01$
 ***: $p < .001$

Figure 2. Path analysis testing the hypotheses.

and creative performance ($\beta = 0.314$, $p = 0.017$). Thus, hypothesis 2 is not supported.

6. Discussion

This article proposes that the causal mechanisms by which monetary rewards affect creative performance are different for extrinsically versus intrinsically motivated people. While the results do not support our hypotheses, they do support the notion of two different pathways. Creative performance can be influenced by the level of self-determination (through intrinsic interest) or the level of performance pressure. Furthermore, as proposed earlier, extrinsically motivated and intrinsically motivated individuals do appear to adhere to somewhat different motivational mechanisms, even though the difference is unexpected.

Looking at the results, it is clear that the reward had no effect on either performance pressure or self-

determination. This might be related to the fact that only \$20 was offered. If the participants did not value this amount of monetary reward, the reward was unlikely to have an effect [39]. It is also possible that controlling for the effect of expected performance information diminishes the effect of a monetary reward. Having an additional control condition without performance feedback could lead to refined understanding of these effects. However, it is noteworthy that the signs of the coefficients (though insignificant) are consistent with our predictions. For example, we proposed that for intrinsically motivated individuals, monetary reward would be negatively related to self-determination and the path coefficient is indeed negative. While for extrinsically motivated individuals, as predicted, the path coefficient between monetary reward and performance pressure is positive, though insignificant. Future research should test the hypotheses with larger monetary rewards and larger

sample sizes, which might generate some support for the predicted relationships.

It is also found that regardless of motivational orientation, level of self-determination was always related to intrinsic interest. Our initial prediction was that this path is significant only for intrinsically motivated individuals. It is possible that even if a person is driven by extrinsic motivation, he or she still will be more interested in an activity if the activity is perceived as self-initiated and self-regulated.

Performance pressure was related to creative performance for intrinsically motivated individuals, but not extrinsically motivated individuals. This might be related to the fact that intrinsically motivated individuals had higher creative self-efficacy ($t(117)=3.92, p<0.001$). When someone has a high level of creative self-efficacy, it is more likely that this person translates performance pressure into creative performance [39]. Including creative self-efficacy in the theorizing might be a viable direction for the future. For example, a threshold level of creative self-efficacy might be a pre-requisite for monetary rewards to have an effect on creative performance.

It is somewhat puzzling why extrinsically motivated individuals showed a relationship between intrinsic interest and creative performance while intrinsically motivated individuals did not. There are many empirical studies connecting intrinsic interest with creative performance. However, it is argued that intrinsic motivation may lead to much cognitive flexibility and in turn novelty, but does not necessarily lead to high utility [27]. In other words, if a person is highly interested in a task, he or she may explore many different possibilities and adopt new approaches, but there is no guarantee that such effort leads to feasible or relevant outcomes. Therefore, it is conceivable that those extrinsically motivated might pay more attention to the utility or relevance dimension so that they are better at translating task interest into outcomes that are both new *and relevant*. This explanation is purely speculative. In the future, evaluating both novelty and relevance of creative performance is necessary to test the notion.

There are also some ways to make the research more relevant to the business world, e.g., using a real life problem as the creative task, and using surveys to study employees in organizations.

In summary, the empirical results in this study did not support our hypotheses. However, they show some support of the notion that there are two distinct causal paths by which monetary reward affects creative performance. More importantly, this study shows that motivational orientation indeed affects the relationships in the two pathways. In practice, the results suggest that managers should reward creative

performance differently based on employees' motivational orientation. Although the exact influence of motivational orientation still needs more investigation, it seems safe to say that monetary reward has different impact for those who are primarily driven by extrinsic motivation, than for those who are driven mainly by intrinsic motivation.

7. Conclusion

We propose that motivational orientation moderates the effect of monetary reward on creative performance. Specifically we contend that extrinsically motivated individuals are positively influenced by monetary reward mainly through performance pressure; while intrinsically motivated individuals are negatively influenced mainly through self-determination. The experiment did not support these specific predictions but showed that these mediated pathways are impacted differently for people of different motivational orientations. In general, we confirm the notion that monetary reward's effect varies with motivational orientation and propose some future research directions.

8. References

- [1] Althuizen, N., and Reichel, A. "The effect of IT-enabled cognitive stimulation tools on creative problem solving: A dual pathway to creativity", *Journal of Management Information Systems*, 33, 2016, pp.11-44.
- [2] Amabile, T.M. "The social psychology of creativity: A componential conceptualization", *Journal of Personality and Social Psychology*, 45, 1983, pp. 257-376.
- [3] Amabile, T. M. "Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace", *Human Resource Management Review*, 3, 1993, pp. 185-201.
- [4] Amabile, T. M. *Creativity in context*. Boulder, CO: Westview Press. 1996.
- [5] Amabile, T. M., Goldfarb, P., and Brackfield, S. C. "Social influences on creativity: Evaluation, coaction, and surveillance", *Creativity Research Journal*, 3, 1990, pp. 231-253.
- [6] Amabile, T. M., Hennessey, B. A., and Grossman, B. S. "Social influences on creativity: The effects of contracted-for reward", *Journal of Personality and Social Psychology*, 50, 1986, pp. 14-23.
- [7] Amabile, T. M., Hill, K. G., Hennessey, B. A., and Tighe, E. M. "The Work Preference Inventory: assessing intrinsic and extrinsic motivational orientations", *Journal of personality and social psychology*, 66(5), 1994, pp. 950-967.
- [8] Azoulay, P., Zivin, J.S.G., and Manso, G. "Incentives and creativity: evidence from the academic life sciences", *RAND Journal of Economics*, 42, 2011, pp. 527-554.

- [9] Baer, M., Oldham, G.R., and Cummings, A. "Rewarding creativity: When does it really matter?", *The Leadership Quarterly*, 14, 2003, pp. 569-586.
- [10] Baer, M., Leenders, R.T.H. A.J., Oldham, G.R., and Vadera, A.K. "Win or lose the battle for creativity: The power and perils of intergroup competition", *Academy of Management Journal*, 53, 2010, pp. 827-845.
- [11] Bartol, K.M., and Locke, E.A. "Incentives and motivation", In S.L. Rynes, and B. Gerhart (Eds.), *Compensation in organizations: Current research and practice*, pp. 104-147. San Francisco: Jossey-Bass. 2000.
- [12] Belcher, D.W. "Toward behavioral science theory of wages", *Academy of Management Journal*, 5, 1962, pp. 102-116.
- [13] Burroughs, J. E., Dahl, D. W., Moreau, C. P., Chattopadhyay, A., and Gorn, G. J. "Facilitating and rewarding creativity during new product development", *Journal of Marketing*, 75, 2011, pp. 53-67.
- [14] Byron, K., Khazanchi, S. "Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses", *Psychological Bulletin*, 138, 2012, pp. 809-830.
- [15] Crutchfield, R. "Conformity and creative thinking", In H. Gruber, G. Terrell, and M. Wertheimer (Eds.), *Contemporary approaches to creative thinking*, pp. 120-140. New York: Atherton. 1962.
- [16] Deci, E. L., and Ryan, R. M. *Intrinsic motivation and selfdetermination in human behavior*. New York: Plenum. 1985.
- [17] Deci, E.L., Koestner, R., and Ryan, R.M. "A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation", *Psychological Bulletin*, 125, 1999, pp. 627-668.
- [18] Eisenberger, R. "Learned industriousness", *Psychological Review*, 99, 1992, pp. 248-267.
- [19] Eisenberger, R., and Armeli, S. "Can salient reward increase creative performance without reducing intrinsic creative interest?" *Journal of Personality and Social Psychology*, 72, 1997, pp. 652-663.
- [20] Eisenberger, R., and Aselage, J. "Incremental effects of reward on experienced performance pressure: positive outcomes for intrinsic interest and creativity", *Journal of Organizational Behavior*, 30, 2009, pp. 95-117.
- [21] Eisenberger, R., and Rhoades, L. "Incremental effects of rewards on creativity", *Journal of Personality and Social Psychology*, 81, 2001, pp. 728-741.
- [22] Eisenberger, R., and Shanock, L. "Rewards, intrinsic motivation, and creativity: A case study of conceptual and methodological isolation", *Creativity Research Journal*, 15, 2003, pp. 121-130.
- [23] Eisenberger, R., Rhoades, L., and Cameron, J. "Effects of reward on intrinsic motivation—Negative, neutral, and positive", *Psychological Bulletin*, 125, 1999, pp. 677-691.
- [24] Forgeard, M. J., and Mecklenburg, A. C. "The two dimensions of motivation and a reciprocal model of the creative process", *Review of General Psychology*, 17(3), 2013, pp. 255-266.
- [25] Frey, B., and Jegen, R. "Motivation crowding theory", *Journal of Economic Surveys*, 15, 2001, pp. 589-611.
- [26] Friedman, R.S. "Reinvestigating the effects of promised reward on creativity", *Creativity Research Journal*, 21, 2009, pp. 258-265.
- [27] Grant, A.M., and Berry, J.W. "The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity", *Academy of Management Journal*, 54, 2011, pp. 73-96.
- [28] Greenberg, J., and Baron, R.A. *Behavior in organizations: Understanding and managing the human side of work*. Upper Saddle River, NJ: Prentice Hall. 2003.
- [29] Hennessey, B.A. "The social psychology of creativity", *Scandinavian Journal of Educational Research*, 47, 2003, pp.253-271.
- [30] Hennessey, B.A., and Amabile, T.M. "Creativity", *Annual Review of Psychology*, 61, 2010, pp. 569-598.
- [31] Hennessey, B.A., and Zbikowski, S.M. "Immunizing Children Against the Negative Effects of Reward: A Further Examination of Intrinsic Motivation Training Techniques", *Creativity Research Journal*, 6, 1993, pp. 297-307.
- [32] Hennessey, B.A., Amabile, T.M., and Martinage M. "Immunizing Children Against the Negative Effects of Reward", *Contemporary Educational Psychology*, 14, 1989, pp. 212-227.
- [33] Kachelmeier, S.J., Reichert, B.E., Williamson, M.G. "Measuring and motivating quantity, creativity or both", *Journal of Accounting Research*, 46, 2008, pp. 341-373.
- [34] Kasof, J., Chen, C., Himsel, A., and Greenberger, E. "Values and creativity", *Creativity Research Journal*, 19, 2007, pp. 105-122.
- [35] Kirton, M. "Adaptors and innovators: A description and measure", *Journal of Applied Psychology*, 61, 1976, pp. 622-629.
- [36] Kruglanski, A. W., Friedman, I., and Zeevi, G. "The effects of extrinsic incentive on some qualitative aspects of task performance", *Journal of Personality*, 39, 1971, pp. 606-617.
- [37] Lepper, M. R., Greene, D., and Nisbett, R. E. "Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis", *Journal of Personality and Social Psychology*, 28, 1973, pp. 129-137.
- [38] Liu, D., Chen, X., and Yao, X. "From autonomy to creativity: A multilevel investigation of the mediating role of harmonious passion", *Journal of Applied Psychology*, 96, 2010, pp. 294-309.
- [39] Malik, M. A. R., Butt, A. N., and Choi, J. N. "Rewards and employee creative performance: Moderating effects of creative self-efficacy, reward importance, and locus of control", *Journal of Organizational Behavior*, 36(1), 2015, pp. 59-74.
- [40] Markova, G., and Ford, C. "Is money the panacea? Rewards for knowledge workers", *International Journal of Productivity and Performance Management*, 60, 2011, pp. 813-823.
- [41] Oldham, G.R., and Cummings, A. "Employee creativity: Personal and contextual factors at work", *Academy of Management Journal*, 39, 1996, pp. 607-634.
- [42] Osterloh, M., and Frey, B.S. "Motivation, knowledge transfer, and organizational forms", *Organization Science*, 11, 2000, pp. 538-572.

- [43] Reinig, B. A., Briggs, R. O., and Nunamaker, J. F. "On the measurement of ideation quality", *Journal of Management Information Systems*, 23(4), 2007, pp. 143-161.
- [44] Rotter, J.B. "Generalized expectancies for internal versus external control of reinforcement", *Psychological Monographs*, 80, 1966, pp. 1-28.
- [45] Ryan, M.R., and Deci, L.E. "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American Psychologist*, 55, 2000, pp. 68-78.
- [46] Sauermann, H., and Cohen, W. M. "What makes them tick? Employee motives and firm innovation", *Management Science*, 56(12), 2010, pp. 2134-2153.
- [47] Selart, M., Nordstroem, T., Kuvaas, B. and Takemura, K. "Effects of reward on self-regulation, intrinsic motivation and creativity", *Scandinavian Journal of Educational Research*, 52, 2008, pp. 439-458.
- [48] Shalley, C. E. "Effects of productivity goals, creativity goals, and personal discretion on individual creativity", *Journal of Applied Psychology*, 76, 1991, pp. 179-185.
- [49] Shalley, C.E., Zhou, J. and Oldham, G.R. "The effects of personal and contextual characteristics on creativity: Where should we go from here?" *Journal of Management*, 30, 2004, pp. 933-958.
- [50] Tierney, P., Farmer, S.M. "Creative self-efficacy: Its potential antecedents and relationship to creative performance", *Academy of Management Journal*, 45, 2002, pp. 1137-1148.

Appendix

The Survey (Reward Condition)

Note: All measures used 7-point Likert scales with 1=Strongly Disagree; 7=Strongly Agree.

You will be asked to perform a creative task: giving titles to a short story. Specifically, you are to provide ten creative titles to the following story. A creative title is one that is both novel and relevant.

You are a tiny golden kernel of popcorn lying in the bottom of a frying pan. Look around you and see the other popcorn kernels that are snuggled up close to each other. Feel it heating, getting warmer, hotter, now burning underneath you. Close to you a popcorn kernel explodes. One by one other popcorn kernels pop to life. White clouds appear to be bursting out all around you. The sound of popping drums in your ears. You are cramped, uncomfortable, steaming hot, sweating dizzy. Your whole body feels too tight. You are trapped within a too-tight suit. Suddenly, you, the popcorn kernel, feel yourself exploding, bursting. All at once you are light and fluffy. Bobbing up and down with other popcorn. At last the popping sound begins to quiet. Just an occasional pop, pop, and at last silence.

You are encouraged to come up with more than ten titles and then select the ten most creative ones and record them below. You may use the blank page at the end as scratch

paper. We will be judging the creativity of your titles on a scale of 1 to 7 with 7 being very creative. If your average creativity score (averaged for the ten titles) is above 5.5, you will be rewarded \$20 for your excellent job. On the next page, please print your titles clearly so that they are very easy to read.

Intrinsic Task Interest

1. The task was interesting
2. The task was boring (reverse scored)
3. The task was unpleasant (reverse scored)
4. The task was enjoyable

Perceived Self-determination

1. I felt I was doing only what others wanted me to do. (reverse scored)
2. I felt I was doing what I wanted to be doing.
3. I felt I was pursuing goals that were my own.
4. While performing the task, I felt a relaxed sense of personal freedom.
5. During the task, I felt free.

Performance Pressure

1. I felt pressured to do the task well.
2. During the task I felt I had to perform well.
3. While performing the task, I felt forced to do a first rate job.
4. While doing the task, I felt driven to do a good job.
5. While doing the task, I felt pushed to perform at a high level.